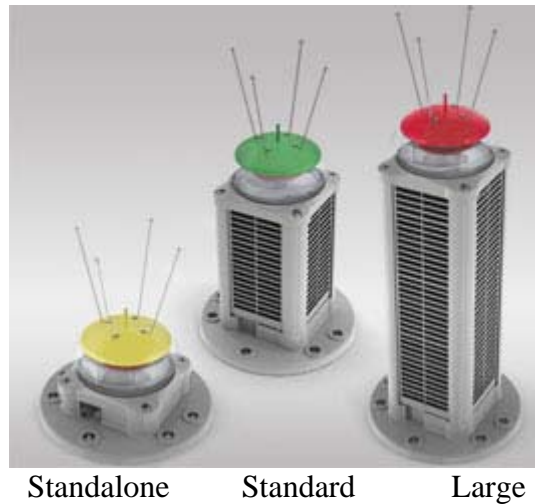


VEGA INDUSTRIES VLB-67 LED LANTERNS

The VLB-67 is a 3-5 nautical mile Light Emitting Diode (LED) lantern suitable for use on both buoys and structures. It is available as a standalone lantern for use with legacy solar power systems, a standard self-contained lantern, and two versions of the large self-contained lantern with one or two batteries.



The standard and large lanterns are completely self-contained and have four solar panels, LED optic head and a lead-acid non-spill rechargeable battery. They are available in white, yellow, red and green. The cap above the lantern indicates the signal color.

Designations

The lanterns have four designations, detailed below:

VLB-67-C07-SA	VLB-67 LED lantern, standalone
VLB-67-C07-SS	VLB-67 self-contained LED lantern, standard power system, 12 AH battery
VLB-67-C07-LS1	VLB-67 self-contained LED lantern, large power system, 12 AH battery
VLB-67-C07-LS2	VLB-67 self-contained LED lantern, large power system, 24 AH battery

Where “C” is the lantern color; **R** – Red, **G** – Green, **W** – White, **Y** - Yellow

The standalone lantern will be used with the legacy solar power system (CG solar panels and batteries) in locations where a self-contained lantern will not work due to inadequate solar insolation. Currently, due to its short height, it should not be used on buoys. A tall base is being developed (and will be available shortly) to elevate the lantern for buoy installations. The self-contained lanterns can be used on any aid (buoys and structures) as long as the constraints of the VLB-67 sizing program are satisfied based on the selected color, intensity, flash rhythm, location, minimum state of charge and autonomy.

Effective Intensity

Lanterns have adjustable effective intensity settings. Lanterns use the Schmidt-Clausen correction feature which maintains constant effective intensity regardless of flash rhythm.

VLB-67 lanterns have the following effective intensity selections (all colors and rhythms, except as noted):

5 cd	24 cd	37 cd
10 cd	25 cd	54 cd
15 cd	29 cd	77 cd

*The maximum effective intensity for yellow is 29 candela (cd).

When replacing a 155mm or 250mm lantern with a LED lantern, it is generally a good idea to target a LED lantern effective intensity that is at least equal to that of the lantern it replaces. For comparison, the VLB-67 solar sizing program compares the intensity of legacy signal equipment with the selected intensity for the VLB-67.

Purchase

CGHQ established a 5 year requirements contract with Vega Industries. Orders for lanterns are placed through Ms. Jing Liu at the SILC in Alameda, CA. Provide a copy of the funded procurement request to her with the “**CIMS bound box**” checked, routed to inbox **7513C** and she will draft a delivery order with Vega. You must contact Mr. Jon Grasson at COMDT (CG-432A) upon receipt of the lanterns so payment can be authorized. Current pricing for Vega lanterns is available from your training team chief or COMDT (CG-432A)
<http://www.uscg.mil/hq/cg4/cg432/organization.asp>

Lanterns must be purchased directly from Vega via the SILC using the following format (it would be helpful to the contract specialist if the **Item No.** listed in the contract is included with your order):

VLB-67-(Color)07-(Size); Ex: VLB-67-R07-SS *Red, standard self-contained, 12 AH batt.*

Where: Color = W, R, G, Y for White, Red, Green and Yellow, respectively.
 Size = SA, SS, LS1, LS2, as defined on page 1

Solar Sizing

Use the solar sizing program “Vega VLB-67 Sizing Program” on our website:
<http://www.uscg.mil/hq/cg4/cg432/publications.asp> to determine which size power system is required for the selected color/effective intensity/rhythm selection. Use the smallest power system allowable by the program. Note that some combinations will not have a solution which will require either the larger VLB-36 self-contained LED lantern or a stand-alone LED lantern and a legacy solar panel and battery. This normally occurs in northern latitudes and/or rhythms with high duty cycles (Q, Mo(A), Iso rhythms). **Do not assume that the same size lantern will be used in the same waterway; you must perform a solar sizing for each color/rhythm/effective intensity combination.**

For the VLB-67-C07-SA standalone lantern, use the minor aids solar design spreadsheet, (or the buoy program, as appropriate) also on that website.

Programming/Battery Charging

Lanterns are programmed using the Vega IR remote control or any TV remote control. There is no need to open the lantern prior to installation unless the battery needs to be recharged. All programming, battery state of charge determination and settings can be made external to the lantern. An optional computer interface (using a non-CG imaged computer) is being evaluated.

Programming - Overview

The lantern must be programmed to the proper flash rhythm, effective intensity and daylight control transition level before deployment.

The lantern is programmed using the Vega Infrared (IR) Remote Control or RCA TV remote. There are about 30 different RCA TV Universal Remote Controls. The remote must be **initialized** so that the remote can communicate with the lantern. Different models have different initialization procedures. If the remote purchased uses a 3-digit code use code 0 6 2. If the remote uses a 4-digit code, then use code 1 0 6 2. **Consult the instructions that come with the remote.** Follow the “Direct Entry Method” for programming a TV as shown in the instructions. Initialization will likely take one of the following two forms:

Press and hold	CODE SEARCH	until red light on remote turns on
Press	TV	red light on remote will blink once
Enter	0 6 2	red light will blink once after each entry
or		
Press and hold	TV	keep holding TV button!
Enter	1 0 6 2	while still holding TV button
Release TV button		

You are now ready to program the Vega VLB-67 lantern.

Gather the information needed to program the lantern; effective intensity and flash rhythm code. The effective intensity is the actual effective intensity value chosen in the Vega VLB-67 spreadsheet. You can check the existing entries; see Programming – Reading a Program Setting detailed later in this instruction.

Standard CG Flash Rhythms

Rhythm	Code	Rhythm	Code
FL2.5 (0.3)	310	Q	601
FL4 (0.4)	321	Mo(A)	801
FL6 (0.6)	337	Iso 2	100
FL (2+1) 6	472	Iso 6	104
FL (2) 5	406	Oc 4	205
FL (2) 6	416		

Programming - Overview (cont'd)

Intensity codes are four digit numbers* corresponding to the effective intensity of the lantern:

Intensity Codes*

Effective Intensity	Code	Effective Intensity	Code	Effective Intensity	Code
5 candelas	0005	24 candelas	0024	37 candelas	0037
10	0010	25	0025	54	0054
15	0015	29	0029	77	0077

*Not available for all rhythms and colors. Use the Vega VLB-67 Sizing Program to determine the maximum allowable intensity.

Programming Notes:

- Lanterns can be programmed in either daytime or nighttime mode (outside or in a darkened room).
- Standalone lanterns must be powered by a 12 VDC source (battery or power supply); black or brown is positive and white or blue is negative. The green/yellow sync wire is left disconnected.
- Programming entries must not lag by more than 10 seconds or the lantern will exit the programming mode. Write down the programming codes for each session to avoid delays.
- The Infrared Receiver (IR) is located in the lens. Aim the remote control 6-12" from the lantern centered at the lens.
- Enter the programming mode by pressing and holding the "red standby", "power" or "program" key on the remote for 5 seconds (up to 60 seconds if in the storage mode). The lantern will display 4 quick flashes (0.1 sec on, 0.1 sec off) indicating that it is in the programming mode.
- Each successful numeric keypad entry will result in 1 flash for each key pressed.
- Wait for the lantern to flash before entering the next digit (don't rush programming).
- When the programming code is recognized, the lantern will display the 3 or 4 digit code as a series of quick flashes with a gap of 0.5 seconds between each "number" of the code. A zero (0) is displayed as a 2 second flash.
- If the programming code is not recognized, the lantern will display 3 quick flashes and the lantern will return to the programming mode (re-enter entire program code again).
- When exiting programming mode, the lantern will display 2 quick flashes, followed by a short pause and another 2 quick flashes, then display the flash rhythm for 16-20 seconds (note: the lantern will not display the flash rhythm when programming the storage mode).
- After programming, write the flash rhythm and intensity setting on the lantern with an indelible ink marker to aid identification while in storage.

Programming

The self-contained lantern is shipped in the “Storage Mode” which essentially turns the light off in both day and night conditions. The operation mode should be changed from “**storage mode**” to “**normal mode**” and then programmed to the desired flash rhythm, effective intensity and daylight control transition level. The lantern can be programmed and placed back into the storage mode if the lantern will not be deployed within two weeks of being programmed. The lantern will retain the last programming sequence (flash rhythm and effective intensity) while in the storage mode. The lantern can be queried in the storage mode and will return to the storage mode after the query.

The programming sequences are grouped together so that all codes can be entered at one time. It is suggested and acceptable to perform the programming operation in four separate sessions (**Operation Mode, Flash Rhythm, Effective Intensity and Daylight Control Transition Level**).

A sample programming session might include the following steps:

1 5 0 0 0	Normal Operating Mode
1 0 3 3 7	FL6(.6) Flash Rhythm
1 1 0 0 7 7	Intensity 77 Candelas
1 4 0 0 9	Day/Night Transition Level

These “steps” can be entered as four separate programming sessions, or sequentially as one long session.

Note that these program codes will remain in memory indefinitely, even after battery replacement. The day/night transition level must be set initially so that the lantern turns on at dusk and off at dawn at the same time as other USCG LED and legacy lanterns.

Programming (cont'd)

Operation Mode. The lantern is shipped in the **Storage Mode** which prevents the light from inadvertently turning on when in a darkened space (storage room, shipping box, etc.) It must be placed in the **Normal Mode** prior to deployment. The programming sequence for the normal mode is:

		<u>Code</u>
Operation	Programming	1
Feature	Operation Mode	5
Value	Normal Mode	000 (Storage mode is code 009)

The programming sequence for this example is **1 5 0 0 0**.

In a darkened room or outside in daylight, aim the remote at the lens and:

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Press and hold the standby/program/power button for up to 60 seconds*. | <p>The lantern will give 4 quick flashes to indicate that it has entered the programming mode.</p> |
| <ol style="list-style-type: none"> 2. Enter the programming sequence for the flash rhythm 15000 (wait for confirmation flash after each digit) | <p>The lantern will flash once each time a key on the programmer is pressed. When the sequence is entered and accepted, the lantern will display the value 000 as a series of flashes: a 2 second flash followed by a 0.5 sec gap, a 2 second flash followed by a 0.5 gap and finally a 2 second flash. (If programming the storage mode the last sequence is 9 quick flashes)</p> |
| <ol style="list-style-type: none"> 3. Leave the programmer idle for 10 seconds to exit the programming mode. | <p>The light will give 2 quick flashes followed by a short pause, then another 2 quick flashes. After that it will flash on the last programmed rhythm for 16-20 sec.</p> |

*While in the storage mode, the receiver in the lantern only checks for programming instructions once every 60 seconds. You must hold the standby/program/power button until the lantern acknowledges with 4 quick flashes. Also, the lantern will only display 4 quick flashes and not the last programmed rhythm after it is put in the storage mode.

Important Note: unsuccessful programming sessions will be followed by 3 quick flashes followed by the lantern returning to the programming mode (step 2). Try the code again, or wait at least 10 seconds to exit the programming mode and reenter the above sequence (step 1).

Programming (cont'd)

Flash Rhythm. Now that the lantern is in the Normal Mode, you can program the flash rhythm. Gather the data for each operation. For example, the following VLB-67 has a flash rhythm of FL6(.6) and an effective intensity setting of 77 candelas. The code for FL6(.6) is **337**. The programming **operation** is code **1**. The flash rhythm **feature** is code **0**.

Assemble the codes, as shown below for your flash rhythm programming sequence:

		<u>Code</u>
Operation	Programming	1
Feature	Flash Rhythm	0
Value	FL6(.6)	337

The programming sequence for this example is **1 0 3 3 7**.

In a darkened room or outside in daylight, aim the remote at the lens and:

- | | |
|---|---|
| 1. Press and hold the standby/program/power button for 5 seconds. | The lantern will give 4 quick flashes to indicate that it has entered the programming mode. |
| 2. Enter the programming sequence for the flash rhythm 10337 (wait for confirmation flash after each digit) | The lantern will flash once each time a key on the programmer is pressed. When the sequence is entered and accepted, the lantern will display the value 337 as a series of flashes: 3 quick flashes followed by a 0.5 sec gap, 3 quick flashes followed by a 0.5 gap and finally 7 quick flashes. |
| 3. Leave the programmer idle for 10 seconds to exit the programming mode. | The light will give 2 quick flashes followed by a short pause, then another 2 quick flashes. After that it will flash on the programmed rhythm for 16-20 seconds. |

Important Note: unsuccessful programming sessions will be followed by 3 quick flashes followed by the lantern returning to the programming mode (step 2). Try the code again, or wait at least 10 seconds to exit the programming mode and reenter the above sequence (step 1).

Programming (cont'd)

Effective Intensity. Next, assemble the codes, as shown below for your intensity setting programming sequence:

		<u>Code</u>
Operation	Programming	1
Feature	Nighttime Intensity	1
Value	Intensity, 77 candelas	0077

The programming sequence for this example is **1 1 0 0 7 7**.

In a darkened room or outside in daylight, aim the remote at the lens and:

- | | |
|--|--|
| 1. Press and hold the standby/program/power button for 5 seconds. | The lantern will give 4 quick flashes to indicate that it has entered the programming mode. |
| 2. Enter the programming sequence for the flash rhythm 110077 (wait for confirmation flash after each digit) | The lantern will flash once each time a key on the programmer is pressed. When the sequence is entered and accepted, the lantern will display the value 0077 as a series of flashes: 2 sec flash followed by a 0.5 sec gap, 2 sec flash followed by a 0.5 sec gap, then 7 quick flashes followed by a 0.5 sec gap and finally 7 quick flashes. |
| 3. Leave the programmer idle for 10 seconds to exit the programming mode. | The light will give 2 quick flashes followed by a short pause, then another 2 quick flashes. After that it will flash on the programmed rhythm at the selected intensity for 16-20 seconds. |

Important Note: unsuccessful programming sessions will be followed by 3 quick flashes followed by the lantern returning to the programming mode (step 2). Try the code again, or wait at least 10 seconds to exit the programming mode and reenter the above sequence (step 1).

Programming (cont'd)

Day/Night Transition Level. This lantern is a standard commercial product sold to many different maritime services and each one uses a different day/night transition level. The VLB-67 has 9 different transition levels and the default level is not the one the USCG uses. The day/night transition level for lanterns installed on USCG aids must be set prior to deployment.

Assemble the codes, as shown below for your day/night transition level:

		<u>Code</u>
Operation	Programming	1
Feature	Day/Night Control	4
Value	250/320 Lux, USCG Level	009

The programming sequence for this example is **1 4 0 0 9**.

In a darkened room or outside in daylight, aim the remote at the lens and:

- | | |
|---|---|
| 1. Press and hold the standby/program/power button for 5 seconds. | The lantern will give 4 quick flashes to indicate that it has entered the programming mode. |
| 2. Enter the programming sequence for the flash rhythm 14009 (wait for confirmation flash after each digit) | The lantern will flash once each time a key on the programmer is pressed. When the sequence is entered and accepted, the lantern will display the value 009 as a series of flashes: 2 second flash followed by a 0.5 sec gap, 2 second flash followed by a 0.5 gap and finally 9 quick flashes. |
| 3. Leave the programmer idle for 10 seconds to exit the programming mode. | The light will give 2 quick flashes followed by a short pause, then another 2 quick flashes. After that it will flash on the programmed rhythm for 16-20 seconds. |

Important Note: unsuccessful programming sessions will be followed by 3 quick flashes followed by the lantern returning to the programming mode (step 2). Try the code again, or wait at least 10 seconds to exit the programming mode and reenter the above sequence (step 1).

*Programming (cont'd)***Programming – Reading a Program Setting**

The IR remote control can be used to identify existing program settings such as: flash rhythm, effective intensity, and battery voltage without reprogramming the lantern.

Program settings can be checked with the lantern in either the Normal Mode or the Storage Mode.

If the lantern is in the Normal Mode aim the programmer at the lens, press and hold the standby/program/power button for 5 seconds. The lantern will respond with 4 quick flashes. After the lantern responds, proceed as indicated below.

If the lantern is in the Storage Mode aim the programmer at the lens, press and hold the standby/program/power button until the lantern responds with 4 quick flashes. This may take up to 60 seconds. After the lantern responds, proceed as indicated below.

To check flash rhythm:

		<u>Code</u>
Operation	Read Settings	9
Feature	Flash Rhythm	0

To check intensity setting:

		<u>Code</u>
Operation	Read Settings	9
Feature	Intensity Setting	1

To check battery voltage:

		<u>Code</u>
Operation	System Checks	3
Feature	Battery Voltage*	1 (example: will display 12.5 volts as a series of flashes; 12.5 is displayed as 1 2 5))

To check day/night transition level:

		<u>Code</u>
Operation	Read Settings	9
Feature	Intensity Setting	4 (lantern should display 09 as a series of flashes)

*Battery voltage should be measured with the solar panels covered with a jacket or blanket. Misleading battery voltages will be present if light (sunlight, ambient and office lighting) falls on the solar panels during this measurement.

Examples are on the next few pages.

Programming – Reading a Program Setting (cont'd)

For example, to check if a lantern is programmed as a FL4(.4), look up the code on page 3 (code 321). In a darkened room or outside in daylight, aim the remote at the lens and:

- | | |
|--|--|
| 1. Press and hold the standby/program/power button for 5 seconds (up to 60 sec if the lantern is in storage mode). | The lantern will give 4 quick flashes to indicate that it has entered the programming mode |
| 2. Enter the programming sequence to determine the flash rhythm: 90 (wait for confirmation flash after each digit). | The lantern will flash once each time a key on the programmer is pressed. When the sequence is entered and accepted, the lantern will display the value 321 as a series of flashes as: 3 quick flashes followed by a 0.5 sec gap, 2 quick flashes followed by a 0.5 gap, 1 quick flash. |
| 3. Leave the programmer idle for 10 seconds. | The lantern will display 2 quick flashes, a pause followed by 2 quick flashes, display the FL4(.4) rhythm for 16-20 seconds, then turn off (if daytime & Normal Mode), flash on rhythm (if nighttime & Normal Mode) or return to Storage Mode (if lantern was in Storage Mode at start of Program Setting checks). |

For example: To check if a lantern is programmed with an effective intensity of 77 candelas, look up the code on page 4 (code 0077). In a darkened room or outside in daylight, aim the remote at the lens and:

- | | |
|---|--|
| 1. Press and hold the standby/program/power button for 5 seconds (up to 60 sec if the lantern is in storage mode). | The lantern will give 4 quick flashes to indicate that it has entered the programming mode. |
| 2. Enter the programming sequence to determine the intensity: 91 (wait for confirmation flash after each digit). | The lantern will flash once each time a key on the programmer is pressed. When the sequence is entered and accepted, the lantern will display the value 0077 as a series of flashes as: 2 sec flash followed by a 0.5 sec gap, 2 sec flash followed by a 0.5 sec gap, 7 quick flashes followed by a 0.5 gap, 7 quick flashes. |
| 3. Leave the programmer idle for 10 seconds. | The lantern will display 2 quick flashes, a pause followed by 2 quick flashes, display the programmed rhythm for 16-20 seconds, then turn off (if daytime & Normal Mode), flash on rhythm (if nighttime & Normal Mode) or return to Storage Mode (if lantern was in Storage Mode at start of Program Setting checks). |

Programming – Reading a Program Setting (cont'd)

For example, to check if a lantern's battery voltage without opening it up, in a darkened room or outside in daylight (with solar panels covered), aim the remote at the lens and:

- | | |
|--|---|
| 1. Press and hold the standby/program/power button for 5 seconds (up to 60 sec if the lantern is in storage mode). | The lantern will give 4 quick flashes to indicate that it has entered the programming mode. |
| 2. Enter the programming sequence to determine the flash rhythm: 31 (wait for confirmation flash after each digit). | The lantern will flash once each time a key on the programmer is pressed. When the sequence is entered and accepted, the lantern will display the battery voltage; for example if it is 12.8 volts: 128 as a series of flashes as: 1 quick flash followed by a 0.5 sec gap, 2 quick flashes followed by a 0.5 gap, 8 quick flashes. |
| 3. Leave the programmer idle for 10 seconds. | The lantern will display 2 quick flashes, a pause followed by 2 quick flashes, display the programmed rhythm for 16-20 seconds, then turn off (if daytime & Normal Mode), flash on rhythm (if nighttime & Normal Mode) or return to Storage Mode (if lantern was in Storage Mode at start of Program Setting checks). |

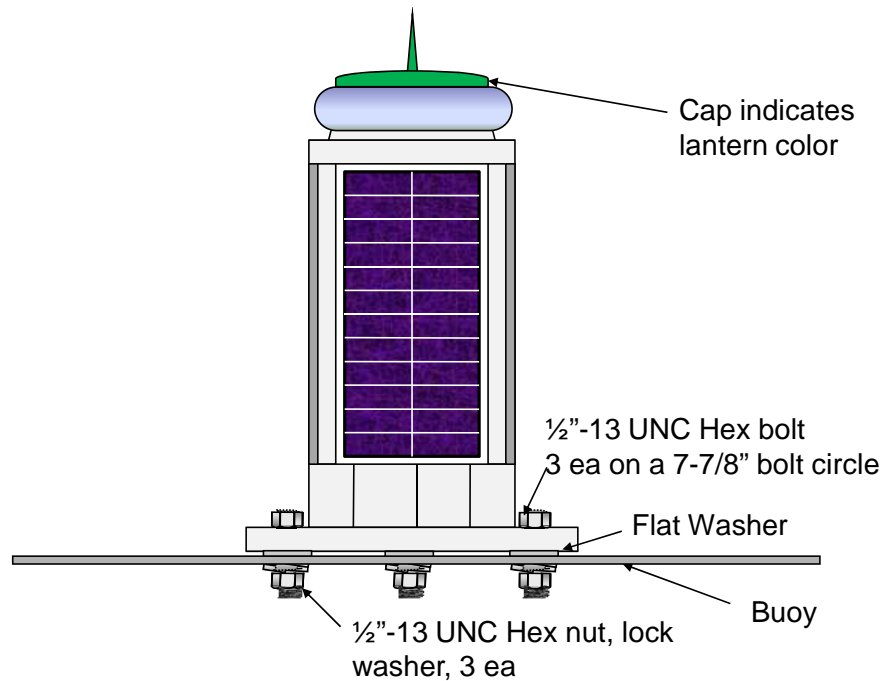
Bench Test

Bench test each beacon at the selected effective intensity and flash rhythm for 24 hours in a darkened room (the daylight control is located behind the lens and may be covered to simulate darkness.)

At the conclusion of the 24 hour test, if the lantern will not be installed for a period exceeding 2-weeks, program it to the “storage mode” otherwise store the lantern outside or in a lighted room at the ANT or onboard the cutter.

Standalone lanterns must be powered by a 12 VDC source (battery or power supply); black or brown is positive and white or blue is negative. The green/yellow sync wire is left disconnected.

Installation – Buoy



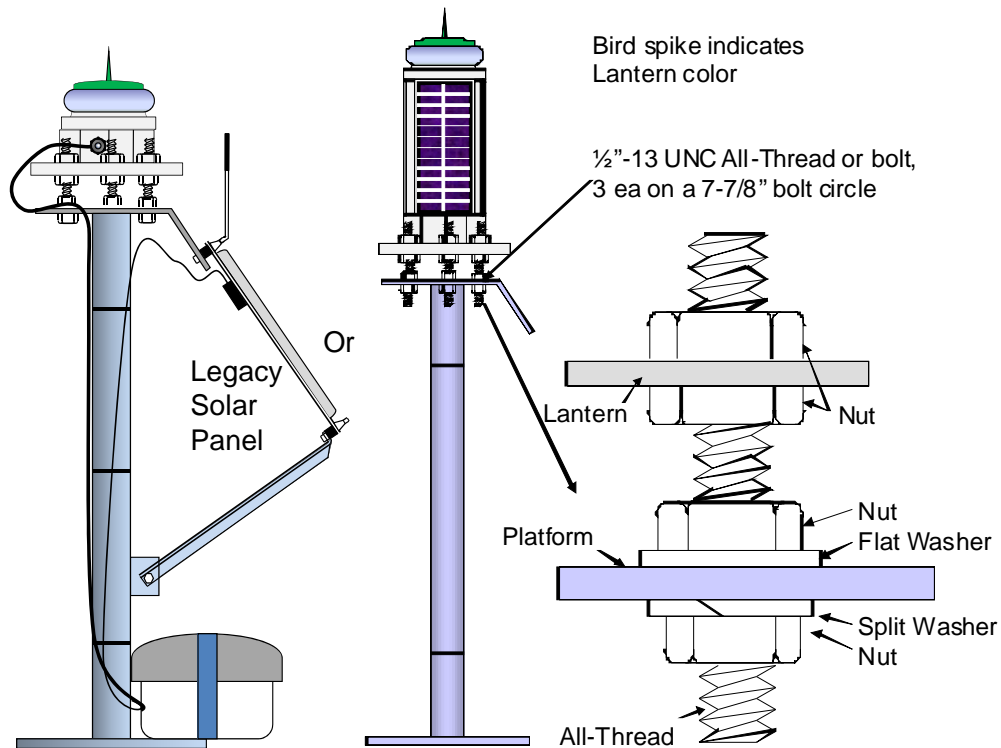
The lantern has provisions for a conventional 3-hole mount on a 7-7/8" bolt circle. Use three 316 stainless-steel 2" x 1/2" -13 coarse thread bolts, flat washers, split lock washers and nuts, as shown above. Insert three stainless steel or nylon flat washers between the lantern and buoy to prevent distortion of the base. Be sure that the extension of the bolt's threads does not obstruct the solar panel.

Cover the lantern with a jacket and note if it turns on and flashes at the correct rhythm.

Install the four bird deterrents by attaching the supplied "antennas" into the holes on top of the lantern with the supplied fasteners, as shown below.

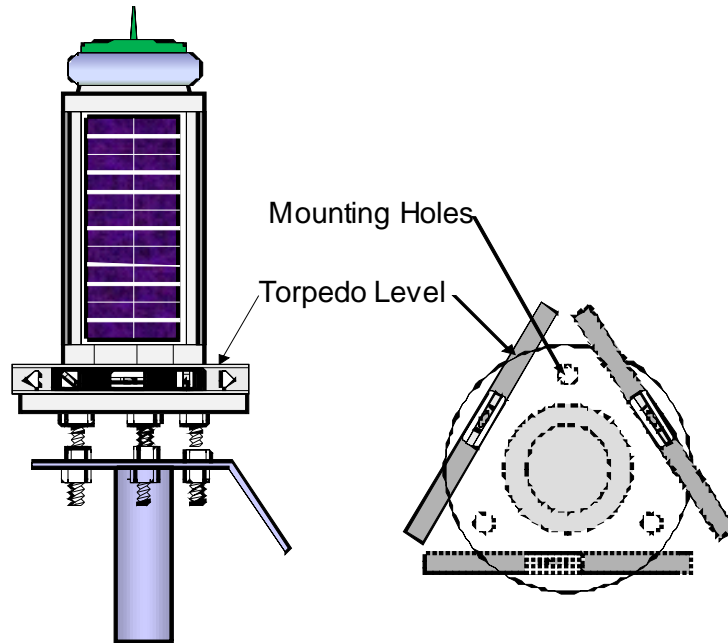


Installation - Structures



Install three 6-8" lengths of stainless steel $\frac{1}{2}$ "-13 UNC All-Thread (or bolts) in the structure and secure loosely (so there is some side-to side movement of the all-thread). Thread three $\frac{1}{2}$ " stainless steel nuts from the top of the all-thread down about 2". Place the lantern on the all-thread and tighten the nuts securing the all-thread to the platform.

Install 3 nuts loosely on the all-thread above the base of the lantern allowing enough movement to level the lantern. Be sure that the extension of the bolt's threads does not obstruct the solar panel or lens.

Installation – Structures (cont'd)

Place a torpedo level on the base of the lantern. Level the lantern using the nuts under the base. Reposition the level and check in all three positions, as shown above. The lantern should be level in all directions.

Tighten the 3 nuts above the base of the lantern, securing the lantern to the platform and recheck using the level. Adjust, if necessary.

For the standalone version, connect the brown or black wire to the positive (+) battery post and the blue or white wire to the negative (-) battery post. The solar panel must be wired at the battery since there are no provisions inside the lantern. The VLB-67-SA is equipped with a 4.9 foot power cable. See page 19 for power cable replacement if a longer cable is needed.

Cover the lantern with a jacket and note if it turns on and flashes at the correct rhythm.

Install the four bird deterrents by attaching the supplied “antennas” into the holes on top of the lantern with the supplied fasteners, as shown on page 13.

Servicing

Servicing should be performed in accordance with the standard cycle established for the aid. The recommended cycle for the lantern is every 2 or 3 years. The lantern should be replaced when it can no longer provide adequate service to the mariner (based on durability of housing, lens and solar panels) with battery replacement at 6 year intervals.

Ensure that the solar panels and lens cover are clean. Wipe with a cloth dampened with mild soap and water, if necessary. Replace bird deterrents, if missing.

Servicing (cont'd)

Cover the lantern with a jacket and note if it turns on and flashes at the correct rhythm. Note any dark areas around the lens indicating non-working LEDs. If present, replace the lantern.

Troubleshooting

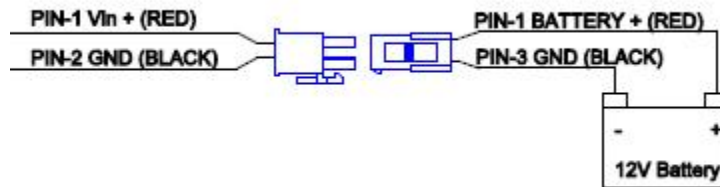
If the lantern is reported discrepant, inspect it for obvious signs of damage; broken lens cover, broken solar panels or evidence of water behind the lens. Replace the lantern.

If solar panels are just covered in bird guano, clean with soap and water. Add additional bird deterrents. Check the battery voltage using the IR remote (see pages 10 & 12). Be sure that the solar panels are covered with a jacket or blanket. If the battery voltage is below 12.2 volts, remove the lantern from service and recharge at CG Base, otherwise allow the lantern to remain on station and recharge using the solar panels.

If the daylight control fails (lantern will not turn off in daylight), replace the lantern.

Back at CG Base or on the Cutter:

Open the lantern (see next section) and measure the battery voltage. If below 12.8 volts, assemble a pigtail using a Molex 39-01-2020 connector and two Molex 39-00-0047 pins (available from www.Mouser.com) and connect the leads to the Schumacher Ship-N-Shore Speed Charge, Model SSC-1000A using the Gel battery setting for Vega batteries and the AGM setting for Power Sonic. Note color coding; red is positive and black is negative. The Power Sonic battery does not need the pigtail; connect charger directly to battery.



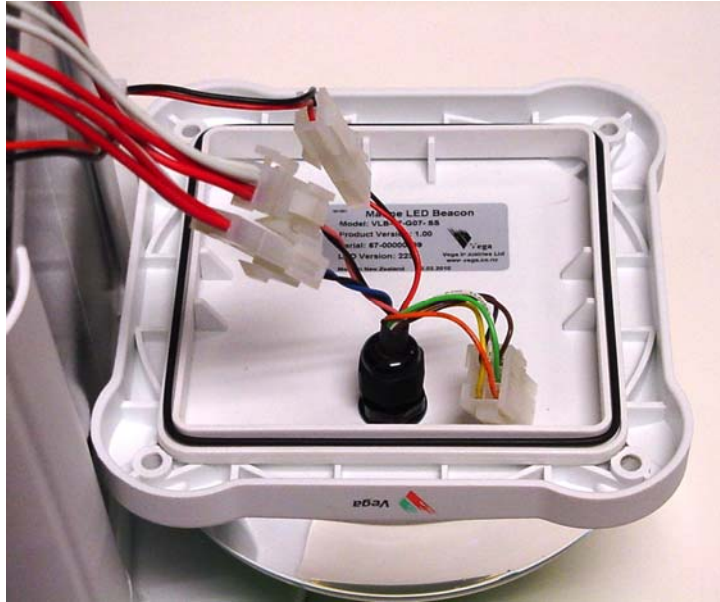
If the battery voltage is acceptable, disconnect one battery lead, wait 10 seconds to reset the processor, and then reconnect. Test the lantern by placing a cover over the lens and note if it flashes on-rhythm.

If the battery was discharged for an extended period (below 11.9 volts for two or more weeks), or the battery will not accept a charge from the charger, or the voltage after the battery stabilizes after the charger is removed is not above 12.8 volts, replace the battery.

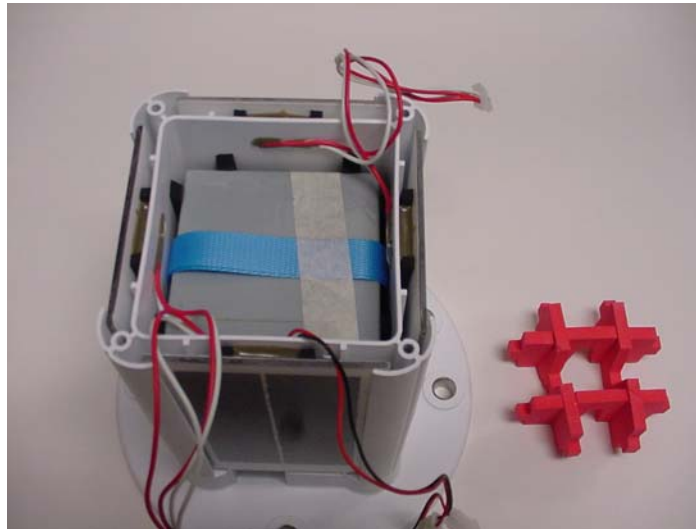
If the lantern fails to operate with a known good battery, contact Commandant (CG-432A) for its disposition.

Battery Replacement

To replace the battery pack, open the lantern by removing the four number 2 square drive fasteners from the top next to the lens (early versions use Torx T-25 security fasteners). The required bit is available from McMaster-Carr <http://www.mcmaster.com>; part number 83335A64 for the Torx and 53315A13 for the square drive). Disconnect the two solar panels connectors (red & white wires) and battery leads (red & black wires) pictured below:

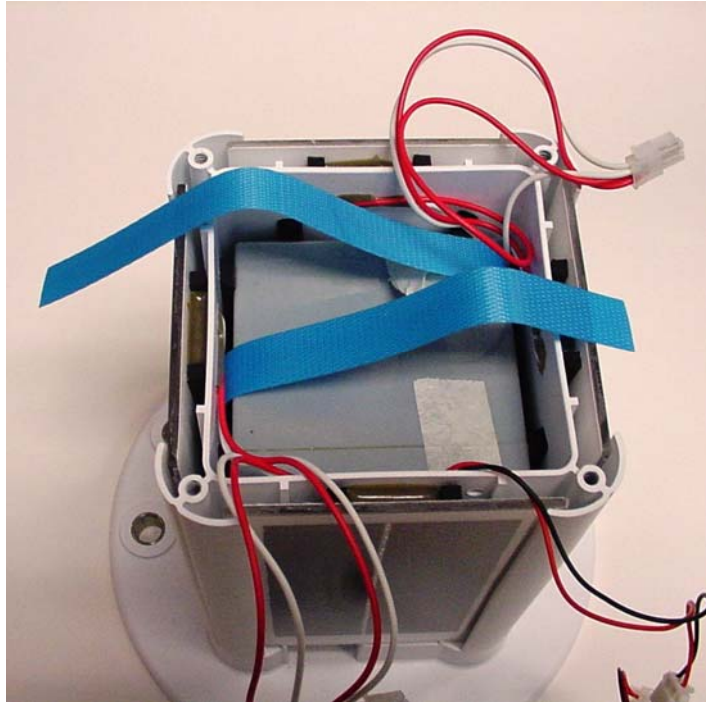


Remove the red foam spacer and snip the tape securing the strap.



Battery Replacement (cont'd)

Pull out each end of the blue strap used to lift the battery. Grab both ends of the strap and pull the battery out of the case (stand on the base and pull evenly so it comes out straight).



Reassemble in reverse order. Be sure to reinstall the red foam spacer. There are two o-rings, one on each side of the square frame. If they fall off stretch them so they fit in the groove of the frame. Carefully tuck the wires inside and reassemble. Do not over tighten the fasteners or the threads in the housing will strip.



(Battery Replacement (cont'd))

The authorized replacements are:

<u>Type</u>	<u>Manufacturer</u>	<u>Part Number</u>
12 volt, 12 AH Gel Lead-Acid	Vega	EBatt-Vega12
12 volt, 12 AH AGM Lead-Acid	Power Sonic	PS-12120

The Vega battery is actually manufactured by HazeUS, but the vent is repositioned and Faston connectors are replaced by a pigtail with plug. Vega will be setting up distributors in the USA. For now, contact Vega for replacement batteries at: sales@vega.co.nz. The alternative is to use the Power Sonic PS-12120 which is available from many sources (Mouser, Battery Warehouse and Amazon). Cut the wire harness off the Vega battery close to the battery, one lead at a time to prevent shorting and install 0.25" female disconnect lugs to each wire (Mouser (www.mouser.com) 517-2240 or 517-2251) using a good crimper. Attach the RED lead to the positive terminal and the BLACK lead to the negative terminal. Wrap the lifting strap around the battery and carefully lower the battery into the case. The external Power Sonic connectors will be tight, but should slide into the case.

Power Cable Replacement

The power cable in the standalone lantern is replaceable by removing the four button head screws from the top of the lantern using a 3mm hex wrench. Replacement cable should be 18/2 SJOW or SJOOW ("SJ" is 300 V insulation, "O" is oil resistance, and "W" is for outdoor use). Jacket diameter should be approximately 0.270"-0.290" for the 18/2 cable. Note: the lantern is wired with 3 conductor cable. We do not use the 3rd conductor for most applications, so 2 conductor wire may be purchased. Sources are: www.awcwire.com (Power Cables and Portable Cords), www.mcmaster.com (Electrical Wire > Type > Multiconductor Cable and Cord Type) or any local supplier. Replacement wire can be spliced to the existing cord using butt connectors, otherwise add a new connector. Use Molex 39-01-2021 connector and 39-00-0041 pins (2) for the power wires. Sync wire can be omitted; if needed use Molex 39-01-2060 connector and 39-00-0038 pins (1). Connectors and pins are available from www.mouser.com. Replacement cable assemblies (preassembled) are available from Vega (sales@vega.co.nz).

Reporting Requirements

Districts shall enter the following information into IATONIS so that your district and CG Headquarters can monitor these lanterns. In the LANTERN TYPE field, select the designation from the drop-down list:

LED VEGAVLB-67-SA	(Vega VLB-67 standalone)
LED VEGAVLB-67-SS-SC	(Vega VLB-67 standard self-contained)
LED VEGAVLB-67-LS1-SC	(Vega VLB-67 large self-contained one battery)
LED VEGAVLB-67-LS2-SC	(Vega VLB-67 large self-contained two batteries)

In LANTERN POWER SETTING field select the appropriate designation:

VEGA 5 cd (these values refer to the intensity selected)

VEGA 10 cd

VEGA 15 cd

VEGA 24 cd

VEGA 25 cd

VEGA 29 cd

VEGA 37 cd

VEGA 54 cd

VEGA 77 cd

(note: if IATONIS does not have these values listed, enter the power setting in the LIGHT SYSTEM REMARKS.

In LAMP TYPE field select the designation: LED

Battery tracking numbers are required. Labels can be affixed under the base of the lantern.

Storage

Self-contained LED lanterns should be stored in a cool, dry place. Lead-acid batteries discharge when they are in storage. Hotter storage locations cause the battery to discharge faster. Batteries must be recharged on a regular basis in order to prevent internal damage to the battery and ensure that sufficient capacity is present to operate the lantern when it is deployed. The VEGA-67 can be stored at the following average temperatures before recharge is necessary:

68 degrees F	10 months
86 degrees F	5 months
104 degrees F	3 months

The battery can be charged by placing the lantern outside in a sunny location for 5 days if the above storage guidelines are followed. The lantern will charge the battery in either the normal or storage mode.

Battery Disposal

These batteries are lead-acid, similar to the Delco-2000 and Sunlyte 12-5000. Recycle these batteries the same way you are currently disposing of conventional solar batteries. Material Safety Data Sheets (MSDS) for the batteries are attached.

Questions/Comments

Questions and comments about this lantern and instructions should be directed to Mr. Jon Grasson at 202-475-5629 email jon.t.grasson@uscg.mil or Mr. Larry Jaeger at 202-475-5624 email larry.e.jaeger@uscg.mil.



Material Safety Data Sheet

Data Sheet No: VRLA GEL Issue 3

Date Issued: January 19th, 2010

1 Identification of the substance

Product name: Valve Regulated Lead Acid, Gelled Electrolyte Battery

Trade name: Lead acid battery

Manufacturers Name: HAZE Battery Ltd
Manufacturers Address: Xiangshuihe,
Dayawan Economy & Technology Development Zone
Huizhou, Guangdong, China. 516085
E mail: Custserv@hazebattery.com
Tel: (86) 0752-5189988
Fax: (86) 0752-5189966

Responsible persons: QA Representative, Managing Director

2 Composition / Ingredient Data

Hazardous Components Chemical Identity	CAS Number	OSHA PEL	ACGIH TLV	Percent By Weight	EC Number	Average
Lead	7439-92-1	50 µg/m ³	50 µg/m ³	45-55%	231-100-4	50%
Sulfuric Acid	7664-93-9	100 µg/m ³	1.00 mg/m ³	19-24%	231-639-5	21%
Lead Oxide	1309-60-0	50 µg/m ³	500 µg/m ³	19-23%	215-174-5	21%

	Risk Phrases	Safety Phrases
Sulphuric Acid	R61,62,20/22,33	S1/2,S26,S30,S45
Lead Oxide	R35	None

3 Hazards Identification

Odour: Not applicable

Appearance: Article as described above

Weight High Density/ Good lifting technique required

Hazards refer to internal component, i.e. lead and sulphuric acid

Contact with eyes: Causes irritation

Contact with skin: May cause dermatitis

Inhalation: May cause irritation

Ingestion: Can cause damage to the kidneys

4 First Aid Measures

Contact with skin: Remove contaminated clothing immediately and drench affected skin with plenty of water, then wash with soap and water.

Contact with eyes: If substance has got into eyes, immediately wash out with plenty of water for at least 15 minutes.

Seek immediate medical attention.

Ingestion: Do not induce vomiting.

Seek immediate medical attention.

Inhalation: Remove patient to fresh air.
Seek medical attention if irritation persists.

5 Fire-Fighting Measures

Auto-ignition point (Hydrogen) 580° C at 760 mm Hg
Wear positive-pressure breathing apparatus
In case of fire use foam, carbon dioxide or dry agent (S43)
Flash point Hydrogen 259° C
Flammable Limits in air, Lower 4.1%
% by 3/4 vol. (Hydrogen)

Fire/explosion

Hydrogen and oxygen gases are produced in the cells during normal battery operation (hydrogen is flammable and oxygen supports combustion).

6 Accidental Release Measures

Immediate Actions: Shut off all ignition sources
Clean Up Actions: Neutralise with soda ash
Place in appropriate container
Ventilate area
Do not empty into drains (S29)

7 Handling and Storage

Under normal conditions of battery use, internal components will not present a health hazard

Handling: Keep away from heat and sources of ignition
Wash hands thoroughly after use
Avoid sparks
Avoid contact with metal jewellery and watches etc.
Do Not Remove Vent Caps
Do not double stack industrial batteries, it may cause damage.

Storage: Keep in cool and dry & Protect from heat.

Store lead acid batteries with adequate ventilation.
Room ventilation is required for batteries utilised for standby power generation.
Never re-charge batteries in an unventilated, enclosed space.

8 Exposure Controls / Personal Protection

Personal protection: Wear safety shoes with toe protector.

Where internal components are liberated use rubber or neoprene boots.

Wear goggles/safety glasses giving complete eye protection.

Respiratory protection may be required under exceptional circumstances when excessive air contamination exists.

Wear PVC mitts, gloves or gauntlets.

Exposure Limits: Lead OES / LTEL - ppm 0.15 mg/m³
Lead Dioxide OES / LTEL - ppm 0.15 mg/m³

9 Physical and Chemical Properties

Odour: Not applicable.
Appearance: Sealed Valve Regulated lead Acid Battery
State under normal temp: Solid
Flash point (Hydrogen): 259° C

Internal components

pH - (Sulphuric acid): 1.3 .
Boiling point: Battery Electrolyte 110° C, Lead 1755° C
(at 760 mm/Hg)
Melting point: Lead 327.4° C
Vapour pressure: 11.7
Vapour density: Battery Electrolyte 3.4, (air =1)
Specific gravity: Battery Electrolyte 1.3 g/cm³. (water =1)
Auto-ignition point: 580° deg C at 760 mm/Hg.
Water solubility: Battery Electrolyte is 100% soluble in water

10 Stability and Reactivity

VRLA Batteries are considered stable at normal conditions.

Keep away from heat and sources of ignition.

Incompatible with reducing agents. Incompatible with organic agents.

Decomposition products may include hydrogen.

Decomposition products may include sulphur oxides.

11 Toxicological Information

Danger of cumulative effects. (R33)

May cause severe irritation.

May cause gastro-intestinal disturbances.

Can cause damage to the mucous membranes.

12 Ecological Information

Ecotoxicology - no information available

13 Disposal Considerations

Classification: This material and/or its container must be disposed of as hazardous waste.

Disposal considerations: Do not discharge into drains or the environment, dispose to an authorised waste collection point.

14 Transport Information

We hereby certify that the HAZE Battery co. range of Maintenance Free Rechargeable Sealed Lead Acid batteries conform to the UN2800 classification as " Batteries, Non- Spillable, and electric storage" as a result of passing the Vibration and Pressure Differential Test described in DOT [49 CFR 173.159(d) and IATA/ICAO [Special Provision A67].

Haze Battery Co. having met the related conditions are EXEMPT from hazardous goods regulations for the purpose of transportation by DOT, and IATA/ICAO, and therefore are unrestricted for transportation by any means.

15 Regulatory information

Classification and labelling Not classified as hazardous for supply

16 Other Information

Under normal conditions of battery use, internal components will not present a health hazard. The information contained in this Safety Data Sheet is provided for battery electrolyte (acid) and lead, for exposure that may occur during battery production or container breakage or under extreme heat conditions such as fire.

Tested as per IMDG Amendment. 34-08, special provision 238 "a" and "b", Comply.

This Safety Data Sheet and the information therein does not constitute the user's own assessment of workplace risk as required by other Health & Safety legislation.



MATERIAL SAFETY DATA SHEET

PS, PSH, PSG, PG and Power Sport Series Valve Regulated (VRLA) Batteries Absorbed Electrolyte (AGM)

Section 1 - Product Identification

Manufacturers Name Power-Sonic Corporation, 7550 Panasonic Way San Diego, CA 92154	Emergency Telephone Numbers: CHEMTREC (Domestic): (800) 424-9300 CHEMTREC (International): (703) 527-3887
	Telephone Number for Information Power-Sonic Corporation: (619) 661-2020
	Date Issued: January 2, 2007

The information contained within is provided as a service to our customers and is for their information only. The information and recommendations set forth herein are made in good faith and are believed to be accurate at the date compiled. Power-Sonic Corporation makes no warranty expressed or implied.

Section 2 - Hazardous Ingredients/Identity Information

Components	CAS Number	Approx Wt. %	OSHA PEL (µg/m ³)	ACGIH TLV (µ/m ³)	NIOSH (µ/m ³)
Inorganic Lead/Lead Compounds	7439-92-1	65%-75%	50	150	10
Tin	7440-31-5	<0.5%	2000	2000	N/A
Calcium	7440-70-2	<0.1%	N/A	N/A	N/A
Electrolyte: Dilute sulfuric Acid	7664-93-9	14-20%	1000	1000	1000
Fiberglass Separator	-	5%	N/A	N/A	N/A
Case Material: Acrylonitrile Butadine Styrene (ABS)	9003-56-9	5-10%	N/A	N/A	N/A

Inorganic lead and electrolyte (sulfuric acid) are the main components of every Valve Regulated Lead Acid battery supplied by Power-Sonic Corporation. Other ingredients may be present dependent upon the specific battery type. For additional information contact Power-Sonic Corporation Technical Department.

Section 3 - Physical/Chemical Characteristics

Components	Density	Melting Points	Solubility (H ₂ O)	Odor	Appearance
Lead	11.34	621 F°	None	None	Silver-Gray
Lead Sulfate	6.20	1950 F°	40mg/l(60 F°)	None	White Powder
Lead Dioxide	9.40	554 F°	None	None	Brown Powder
Sulfuric Acid	About 1.30	203-240 F°	100%	Sharp penetrating pungent	Clear Colorless Liquid
Fiberglass Separator	N/A	N/A	Slight	None	White Fibrous
Case Material: Acrylonitrile Butadine Styrene (ABS)	N/A	N/A	None	None	Solid

Section 4 – Flammability Data

Components	Flashpoint	Explosive Limit	Comments
Lead and Sulfuric Acid	None	None	None
Hydrogen		LEL = 4.1%	Sealed batteries can emit hydrogen if overcharged (float voltage > 2.40 VPC)
Fiberglass Separator	N/A	N/A	Toxic vapors may be released. In case of fire, wear self contained breathing apparatus
Acrylonitrile Butadiene Styrene (ABS)	None	N/A	Temp over 527°F (300°C) may release combustible gases. In case of fire, wear self contained breathing apparatus

Section 5 - Reactivity Data

Stability	Unstable		Conditions to Avoid
	Stable	X	Prolonged overcharge on high current, ignition sources. Sulfuric acid remains stable at all temperatures
Incompatibility (Materials to Avoid) Sulfuric acid: Contact with combustibles and organic materials may cause fire and explosion. Also reacts violently with strong reducing agents, metals, sulfur trioxide gas, strong oxidizers, and water. Contact with metals may produce toxic sulfur dioxide fumes and may release flammable hydrogen gas. Lead Compounds: Avoid contact with strong acids, bases, halides, halogenates, potassium nitrate, permanganate, peroxides, nascent hydrogen, and reducing agents.			
Hazardous Decomposition or Byproducts Sulfuric acid: Sulfur trioxide, carbon monoxide, sulfuric acid mist, sulfur dioxide, and hydrogen sulfide. Lead Compounds: High temperatures above the melting point are likely to produce toxic metal fume, vapor, or dust; contact with strong acid or base or presence of nascent hydrogen may generate highly toxic arsine gas. Hazardous Polymerization.			
Polymerization: Sulfuric acid will not polymerize			
Decomposition Products: Sulfuric Dioxide, Trioxide, Hydrogen Sulfide, Hydrogen.			
Conditions to Avoid: Prohibit smoking, sparks, etc. from battery charging area. Avoid mixing acid with other chemicals.			

Section 6 - Health Hazard Data

Routes of Entry Sulfuric acid: Harmful by all routes of entry Lead compounds: Hazardous Exposure can occur only when product is heated, oxidized, or otherwise processed or damaged to create dust, vapor or fume.
Inhalation Sulfuric Acid: Breathing sulfuric acid vapors and mists may cause severe respiratory problems. Lead Compounds: Dust or fumes may cause irritation of upper respiratory tract or lungs. Fiberglass Separator: Fiberglass is an irritant to the upper respiratory tract, skin and eyes. For exposure up to 10F use MSA Comfoll with type H filter. Above 10F use Ultra Twin with type H filter. This product is not considered carcinogenic by NTP or OSHA.
Skin Contact Sulfuric acid: Severe irritation, burns, cornea damage, and possible blindness. Lead Compounds: May cause eye irritation

Ingestion

Sulfuric acid: May cause severe irritation of the mouth, throat, esophagus, and stomach.

Lead Compounds: May cause abdominal pain, nausea, vomiting, diarrhea, and severe cramping. Acute ingestion should be treated by a physician.

Eye Contact

Sulfuric acid: Severe irritation, burns, cornea damage and possible blindness.

Lead Compounds: May cause eye irritation.

Acute Health Hazards

Sulfuric acid: Severe skin irritation, burns, damage to cornea may cause blindness, upper respiratory irritation.

Lead Compounds: May cause abdominal pain, nausea, headaches, vomiting, loss of appetite, severe cramping, muscular aches and weakness, and difficulty sleeping. The toxic effects of lead are cumulative and slow to appear. It affects the kidneys, reproductive and central nervous systems. The symptoms of lead overexposure are listed above. Exposure to lead from a battery most often occurs during lead reclamation operations through the breathing or ingestion of lead dust or fumes.

Chronic Health Hazards

Sulfuric acid: Possible scarring of the cornea, inflammation of the nose, throat and bronchial tubes, possible erosion of tooth enamel.

Lead Compounds: May cause anemia, damage to kidneys and nervous system, and damage to reproductive system in both males and females.

Carcinogenicity

Sulfuric acid: The National Toxicological Program (NTP) and The International Agency for Research on Cancer (IARC) have classified strong inorganic acid mist containing sulfuric acid as a Category 1 carcinogen, a substance that is carcinogenic to humans. The ACGIH has classified strong inorganic acid mist containing sulfuric acid as an A2 carcinogen (suspected human carcinogen). These classifications do not apply to liquid forms of sulfuric acid or sulfuric acid solutions contained within a battery. Inorganic acid mist (sulfuric acid mist) is not generated under normal use of this product. Misuse of the product, such as overcharging, may result in the generation of sulfuric acid mist.

Lead Compounds: Human studies are inconclusive regarding lead exposure and an increased cancer risk. The EPA and the International Agency for Research on Cancer (IARC) have categorized lead and inorganic lead compounds as a B2 classification (probable/possible human carcinogen) based on sufficient animal evidence and inadequate human evidence.

Medical Conditions Generally Aggravated by Exposure

Inorganic lead and its compounds can aggravate chronic forms of kidney, liver, and neurological diseases. Contact of battery electrolyte (acid) with the skin may aggravate skin diseases such as eczema and contact dermatitis. Overexposure to sulfuric acid mist may cause lung damage and aggravate pulmonary conditions.

Emergency and First Aid ProceduresInhalation

Sulfuric acid: Remove to fresh air immediately. If breathing is difficult, give oxygen

Lead Compounds: Remove from exposure, gargle, wash nose and lips, consult physician

Ingestion

Sulfuric acid: Do not induce vomiting, consult a physician immediately.

Lead Compounds: Consult a physician immediately

Eyes

Sulfuric acid: Flush immediately with water for 15 minutes, consult a physician.

Lead Compounds: Flush immediately with water for 15 minutes, consult a physician

Skin

Sulfuric acid: Flush with large amounts of water for at least 15 minutes, remove any contaminated clothing. If irritation develops seek medical attention.

Lead Compounds: Wash with soap and water.

Section 7 - Precautions for Safe Handling and Use

Steps to be Taken in Case Material is Released or Spilled

There is no release of material unless the case is damaged or battery is misused/overcharged. If release occurs stop flow of material, contain/absorb all spills with dry sand, earth, or vermiculite. Do not use combustible materials. Neutralize spilled material with soda ash, sodium bicarbonate, lime, etc. Wear acid-resistant clothing, boots, gloves, and face shield. Dispose of as hazardous waste. Do not discharge acid to sewer

Waste Disposal Method

Spent Batteries - send to secondary lead smelter for recycling. Follow applicable federal, state and local regulations. Neutralize as in preceding step. Collect neutralized material in sealed container and handle as hazardous waste as applicable. A copy of this MSDS must be supplied to any scrap dealer or secondary lead smelter with the battery.

Precautions to be Taken in Handling and Storing

Store batteries in a cool, dry, well ventilated area that are separated from incompatible materials and any activities which may generate flames, sparks, or heat. Keep all metallic articles that could contact the negative and positive terminals on a battery and create a short circuit condition.

Electrical Safety

Due to the battery's low internal resistance and high power density, high levels of short circuit current can be developed across the battery terminals. Do not rest tools or cables on the battery. Use insulated tools only. Follow all installation instructions and diagrams when installing or maintaining battery systems.

Fiberglass Separator

Fiberglass is an irritant to the upper respiratory tract, skin and eyes. For exposure up to 10F°/ use MSA Comfoll with type H filter. Above 10F use Ultra Twin with type H filter. This product is not considered carcinogenic by NTP or OSHA.

Section 8 - Control Measures

Respiratory Protection

None required under normal conditions. If battery is overcharged and concentrations of sulfuric acid are known to exceed PEL use NIOSH or MSH approved respiratory protection.

Engineering Controls

Store and handle batteries in a well ventilated area. If mechanical ventilation is used, components must be acid resistant

Protective Gloves

None needed under normal conditions. If battery case is damaged use rubber or plastic elbow length gauntlets

Eye Protection

None needed under normal conditions. If handling damaged or broken batteries use chemical splash goggles or face shield

Other Protective Clothing or Equipment

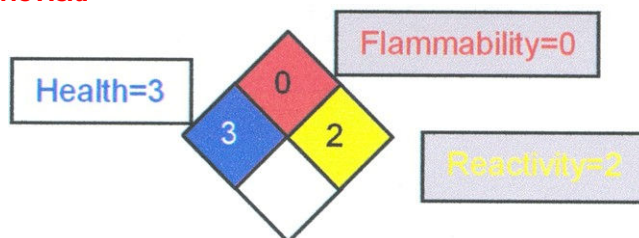
None needed under normal conditions. In case of damaged or broken battery use an acid resistant apron. Under severe exposure or emergency conditions wear acid resistant clothing.

Work Hygienic Practices

Handle batteries carefully to avoid damaging the case. Do not allow metallic articles to contact the battery terminals during handling. Avoid contact with the internal components of the battery.

Section 9 Regulatory Information

NFPA Hazard Rating for Sulfuric Acid



Transportation Batteries. Non-Restricted Status

North America Surface and Air Shipments

Our nonspillable lead acid batteries are listed in the U.S. Department of Transportation's (DOT) hazardous materials regulations but are **excepted** from these regulations since they meet all of the following requirements found at 49 CFR 173.159(d) – NMFC # 60680 Class 65.

- When offered for transport, the batteries are protected against short circuits and securely packaged as required by 49 CFR 173.159(d) (1);
- The batteries and outer packaging are marked with the words NONSPILLABLE BATTERY as required by 49 CFR 173.159(d) (2); and
- The batteries comply with the vibration and pressure differential tests found in 49 CFR 173.159(d) (3) and "crack test" found at 49 CFR 173.159(d) (4).

International

Our non-spillable lead acid batteries also are **excepted** from the international hazardous materials (also known as "dangerous goods") regulations since they comply with the following requirements:

- The vibration and pressure differential tests found in Packing Instruction 806 and Special Provision A67 of the **International Air Transport Association (IATA) Dangerous Goods Regulations**;

The vibration and pressure differential tests found in Packing Instruction 806 and Special Provision A67 of the International Civil Aviation Organization (ICAO) Technical Instructions for the Safe Transport of Dangerous Goods by Air; and

- The vibration, pressure differential, and "crack" tests found in Special Provision 238.1 and 238.2 of the **International Maritime Dangerous Goods (IMDG) Code**.

Regulatory Information

RCRA: Spent lead acid batteries are not regulated as hazardous waste by the EPA when recycled, however state and international regulations may vary.

CERCLA (superfund) and EPCRA:

- Reportable Quantity (RQ) for spilled 100% sulfuric acid under CERCLA (superfund) and EPCRA (Emergency Planning Community Right to Know Act) is 1,000lbs. State and local reportable quantities for spilled sulfuric acid may vary.
- Sulfuric acid is a listed "Extremely Hazardous Substance" under EPCRA with a Threshold Planning Quantity (TPQ) of 1,000lbs.
- EPCRA Section 302 Notification is required if 1,000lbs. or more of sulfuric acid is present at one site. The quantity of sulfuric acid will vary by battery type. Contact Power-Sonic Corporation for additional information.
- EPCRA Section 312 Tier 2 reporting is required for batteries for batteries if sulfuric acid is present in quantities of 500lbs. or more and/or lead is present in quantities of 10,00lbs. or more.
- Supplier Notification: This product contains toxic chemicals which may be reportable under EPCRA Section 313 Toxic Chemical Release Inventory (Form R) requirements. If you are a manufacturing facility under SIC codes 20 through 39 the following information is provided to enable you to complete the required reports:

Regulatory Information continued:

(f)

Toxic Chemical	CAS Number	Approximate % by weight
Lead	7439-92-1	60
Sulfuric Acid	7664-93-9 10-	30
Arsenic	7440-38-2	0.2

If you distribute this product to other manufacturers in SIC codes 20 through 39, this information must be provided with the first shipment in a calendar year. The Section 313 supplier notification requirement does not apply to batteries which are "consumer products". Not present in all battery types. Contact Power-Sonic Corporation for further information.

TSCA

Ingredients in Power-Sonic Corporation's batteries are listed in the TSCA Registry as follows:

Components	CAS Number	TSCA Status
Electrolyte Sulfuric Acid (H ₂ SO ₄)	7664-93-9	Listed
Inorganic Lead Compound: Lead (Pb)	7439-92-1	Listed
Lead Oxide (PbO)	1317-36-8	Listed
Lead Sulfate (PbSO ₄)	7446-14-2	Listed
Arsenic (As)	7440-38-2	Listed
Calcium (Ca)	7440-70-2	Listed
Tin (Sn)	7440-31-5	Listed

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